TC12/TC13 TS11 EMULATION

INSTALLATION DIAGNOSTIC (IUT13)

USER'S GUIDE

EMULEX

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1.1 INTRODUCTION

This manual is designed to serve as a guide for those using the Emulex TC12/TC13 TS11 Emulation Installation Diagnostic, IUT13, on Digital Equipment Corporation (DEC) VAX-11 computers. IUT13 is designed to run under the Emulex VAX Monitor, EVM.

This program is designed for use by qualified installers of Emulex equipment, and thus it assumes that the user has some knowledge of hardware configurations, VAX architecture and terminology, and interpretation of error messages and device register contents.

This document contains two main sections, the contents of which are described briefly below.

Section 1   General Description: This section contains an overview of the IUT13 installation diagnostic, including its functions, distribution media, hardware and software compatibility, and related documentation.

Section 2   Operation: Describes operation of IUT13, including load and start procedures, diagnostic tests, and sample output.

1.2 PRODUCT OVERVIEW

IUT13 is an installation diagnostic for the Emulex TC12 and TC13 Tape Couplers, which emulate the DEC TS11 tape subsystem. For more detailed information, see the TC12 or TC13 Technical Manual (reference given in subsection 1.5).

1.3 DISTRIBUTION MEDIA

The following table lists and describes distribution media for IUT13 and other Emulex VAX diagnostic software.

Emulex P/N	Description
VX9960407	TU58 cassette for VAX-11/750
VX9960507	Eight-inch floppy diskette for VAX-11/780
VX9960910	9-track mag tape for VAX-8600

1.4 COMPATIBILITY AND REQUIREMENTS

1.4.1 HARDWARE

IUT13 is compatible with the following hardware:

- DEC VAX-11/730, 11/750, and 11/780 computers

- Emulex TC12/FS and TC13 tape couplers

- Up to four tape drives, including the following:

  - CDC (Tandberg), model 92180
  - CDC (Keystone), model 92181
  - Cipher, models F100X and F900X
  - Cipher, models 880, CT-75, CT-125
  - Digi-Data, all formatted models
  - Kennedy, formatted start/stop model
  - Kennedy, streamer model
  - Pertec, formatted start/stop model

1.4.2 SOFTWARE

IUT13 is designed to run with the Emulex VAX Monitor, EVM. For information regarding EVM, see the EVM User's Manual referenced in subsection 1.5.

1.5 RELATED DOCUMENTATION

The Emulex documents referenced in this manual may be ordered from the following address:

    Emulex Corporation
    3545 Harbor Blvd.
    Costa Mesa, CA 92626
    (714) 662-5600 TWX 910-595-2521

Title: Emulex VAX Monitor (EVM) User's Guide
Publication Number: VX9950901

Title: VAX Configuration Utility (IVV000) User's Guide
Publication Number: VX9950905

Title: TC12/FS (TS11 Compatible) Tape Coupler Technical
                     Manual
Publication Number: TC1251002

Title: TC13 (TS11 Compatible) Tape Coupler Technical
                     Manual
Publication Number: TC1351001

2.1 OVERVIEW

This section describes IUT13 load and start procedures, defines the
20 diagnostic tests, and presents sample configure statements and
sample output.

User input appears in **bold** type, to distinguish it from monitor or
diagnostic program output. The symbol **<return>** signifies the
carriage return key. Addresses are given in octal radix.

2.2 LOAD AND START PROCEDURES

2.2.1 INVOKING EVM

The procedure used to invoke EVM varies from one VAX system to
another. For a description of EVM bootstrapping procedures, see the
Emulex VAX Monitor (EVM) User's Guide (reference given in subsection
1.5).

2.2.2 LOADING IUT13

After the EVM> prompt has appeared on the screen, type the following.
(The default filename extension is .EXE.)

EVM>**LOAD IUT13<return>**

The LOAD statement is followed by a SET CONFIGURATION statement, the
content of which depends upon the VAX system being used. Sample
configure statements are presented in subsections 2.2.3 through
2.2.5. We recommend that the SHOW CONFIGURATION statement also be
used to verify that the configuration is correct.

2.2.3 SAMPLE CONFIGURE STATEMENT FOR VAX-11/730

This sample configure statement refers to a VAX-11/730 with a TC13 at
the standard address and vector (772520 and 224 respectively). Drive
0 is to be tested. For an explanation of abbreviations, EVM command
syntax, and other conventions, see the EVM User's Guide.

EVM>**SET CONFIG/DR:0/CSR:772520/VECTOR:224<return>**

2.2.4 SAMPLE CONFIGURE STATEMENT FOR VAX-11/750

This statement refers to a VAX-11/750 with a TC13 at the standard address and vector, and with UNIBUS adapter UBA0: (base address FC0000). Drive 0 is to be tested.

    EVM>SE C/DR:0/CSR:772520/VECTOR:224/ADAPTER:0/BR:5/UBR:5<return>

In the preceding statement, /ADAPTER is optional and needs to be specified only if a value other than UBA0: is desired. Adapter 0 is the default. Valid values for ADAPTER are 0 or 1:

    ADAPTER #0   UBA0, FC0000
    ADAPTER #1   UBA1, F30000

2.2.5 SAMPLE CONFIGURE STATEMENT FOR VAX-11/780

This statement refers to a VAX-11/780 with a TC13 at the standard address and vector, and with UNIBUS adapter UBA0: (TR = 3). Drive 0 is to be tested:

    EVM>SE C/DR:0/CSR:772520/VECTOR:224/TR:3/BR:5<return>

In the preceding statement, /TR is optional and needs to be specified only if a value other than TR 3 (UBA0:) is desired. Acceptable values for TR are 3 through 6:

    TR 3   UBA0, 20100000
    TR 4   UBA1, 20140000
    TR 5   UBA2, 20180000
    TR 6   UBA3, 201C0000

/BR and /UBR are optional and need to be specified only if the UNIBUS adapter has BR and UBR levels other than 5. Valid values for BR are 4 through 7, with 5 the standard.

2.2.6 IUT13 PROMPTS

Two prompts will appear on the screen before you start test execution. The first asks whether the tape transport supports read reverse function:

    Tape drive supports read reverse function? (Y/N) [(N)]>>>

Answer **Y** (yes) to this question if the drive under test supports a read reverse function; otherwise, type **N** (no), or simply enter <return> (the default response is **N**). The CDC drive, for example, does not support a read reverse function in GCR mode.

The second prompt asks whether you will run IUT13 test 20, the write protection test, which needs to be run manually:

Run manual test? (Y/N) [(N)]>>>

If you type **N** in response to this question, or simply enter **<return>** for the default,, Test 20 is skipped. Otherwise, an operator is needed to remove the write ring before continuing the test.

2.2.7 START PROCEDURE

After typing the LOAD and SET CONFIGURATION statements, begin program execution by typing the following:

EVM>**ST<return>**

The ST (START) command can be used with the qualifiers /PASSES and/or /TEST. For details of command syntax and abbreviations, see the EVM User's Guide.

- /PASSES needs to be specified only if multiple passes are desired; the default value is 1. Valid values for x are 0 through 100, where 0 signifies an infinite number of passes.

- /TEST is used to specify which tests are to be run. If this qualifier is omitted, all tests are run. If it is included, it must be followed by at least one test number.

In case of unexpected interrupts or system hang-ups, use <ctrl-p> (the CONTROL key and P character key pressed simultaneously) to get back in console I/O mode. Then enter the following console mode commands:

```
>>>H          ;Halt CPU
>>>I          ;Initialize system
>>>UNJAM      ;Restore system
>>>S 10000    ;Restart EVM
```

2.3 TESTS

The IUT13 diagnostic includes 20 test modules, as follows:

Test 01   Register Accessibility Test

This test reads TSBA and TSSR to assure the accessibility of both registers. The UNIBUS adapter status is verified for related errors.

Test 02   Initialize Transport by Loading TSSR Test

This test initializes the TC12/13 transports by writing a 0 (zero) into the TSSR.

Test 03   TC12/13 Wraparound Test (High Byte)

This test assures the addressability of TXDB. It is performed in maintenance mode by writing patterns 01010101, 00110011, 00001111, and 00000000 into the high byte of TSDB. The test verifies the corresponding bits in TSSR for UBA address bits 17 through 16.

Test 04   TC12/13 Wraparound Test (Low Byte)

This test assures the addressability of TSDB. It is performed in maintenance mode by writing patterns 01010101, 00110011, 00001111, and 00000000 into the low byte of TSDB. The TSSR is verified for proper status.

Test 05   Write Characteristics Command Test

This test assures the functionality of the Write Characteristics command. The message packet and TSSR register are checked for proper status.

Test 06   Transport Initialize Test

This test assures the functionality of the Transport Initialize command. The message packet is checked for the proper status.

Test 07   Get Status Immediate Test

This test assures the ability of the Get Status Immediate command to interrogate and retrieve the status of the TC12/13 subsystem.

Test 08   Message Buffer Release Command Test

This test assures the functionality of the Message Buffer Release command. This command, when executed with the ACK bit set, allows the transport to own the message buffer area on an ATTN.

Test 09   Register Modification Refused Test

This test assures that the SC (special condition) and RMR (register modification refused) bits will be set if an attempt is made to issue a command while the SSR (subsystem ready) is not true.

Test 10   NXM Error Test

This test assures that the SC (special condition) and NXM (non-existent memory error) bits will be asserted when an attempt is made to transfer data from a non-existent memory location.

Test 11   Illegal Command Test

This test assures that the ILC (illegal command) bit will be asserted in the XSTO register when a non-supported command is issued.

Test 12   Illegal Address Test

This test verifies that the ILA (illegal address) bit will be asserted in the XSTO register when a command is issued with a pointer address that exceeds 18 bits.

Test 13   Interrupt Test

This test verifies that the TC12/13 subsystem interrupts at the selected level (BR 5) after a command with IE is completed.

Test 14   Rewind Command Test

This test verifies the functionality of the Rewind commmand, and also checks for proper status.

Test 15   Write/Read Command Test

This test verifies the functionality of the Write, Read Next, and Read Previous commands. It makes sure that the tape is positioned correctly. The data validity is not assured at this point, however; see Test 19.

Test 16   Erase Command Test

This test verifies the functionality of the Erase command.

Test 17   Write/Read Tape Mark Test

This test verifies that a tape mark can be written correctly, and that it can be read over in both directions.

Test 18   Space Record Command Test

This test verifies the functionality of the Space Record Forward and Reverse commands.

Test 19   Write/Read Data Test

This test verifies the functionality of the Write and Read commands. The data is first written on the tape, then read back in both reverse and forward directions. The data validity is also assured.

Test 20 Write Protection Test

    This test verifies that the WL (write lock) status is indicated
    properly for a write protected drive. Also, it verifies that
    the WLE (write lock error) bit is asserted if an attempt is made
    to write to a write protected drive.

2.4 SAMPLE OUTPUT

After you start the program, a display similar to the following
appears on the screen:

    Emulex VAX-UNIBUS TC12/13 diagnostic software REV 1.0
      24-JUL-1984 9:1:16

The 20 test modules are then executed. As each test is run, the
program prints out its title:

    TEST 01 Register Accessibility Test 12-OCT-1984 9:10:0
    TEST 02 Initialize Transport by Loading TSSR Test 12-OCT-1984
    TEST 03 TC12/13 Wraparound Test (high byte) 12-OCT-1984 9:10:3
    TEST 04 TC12/13 Wraparound Test (low byte) 12-OCT-1984 9:10:5
    TEST 05 Write Characteristics Command Test 12-OCT-1984 9:10:8
    TEST 06 Transport Initialize Test 12-OCT-1984 9:10:10
    TEST 07 Get Status Immediate Test 12-OCT-1984 9:10:13
    TEST 08 Message Buffer Release Command Test 12-OCT-1984 9:10:15
    TEST 09 Register Modification Refused Test 12-OCT-1984 9:10:17
    TEST 10 NXM Error Test 12-OCT-1984 9:10:19
    TEST 11 Illegal Command Test 12-OCT-1984 9:10:21
    TEST 12 Illegal Address Test 12-OCT-1984 9:10:23
    TEST 13 Interrupt Test 12-OCT-1984 9:10:25
    TEST 14 Rewind Command Test 12-OCT-1984 9:10:27
    TEST 15 Write/Read Command Test 12-OCT-1984 9:10:29
    TEST 16 Erase Command Test 12-OCT-1984 9:10:31
    TEST 17 Write/Read Tape Mark Test 12-OCT-1984 9:10:33
    TEST 18 Space Record Command Test 12-OCT-1984 9:10:35
    TEST 19 Write/Read Data Test 12-OCT-1984 9:10:36
    TEST 20 Write Protection Test 12-OCT-1984 9:10:37